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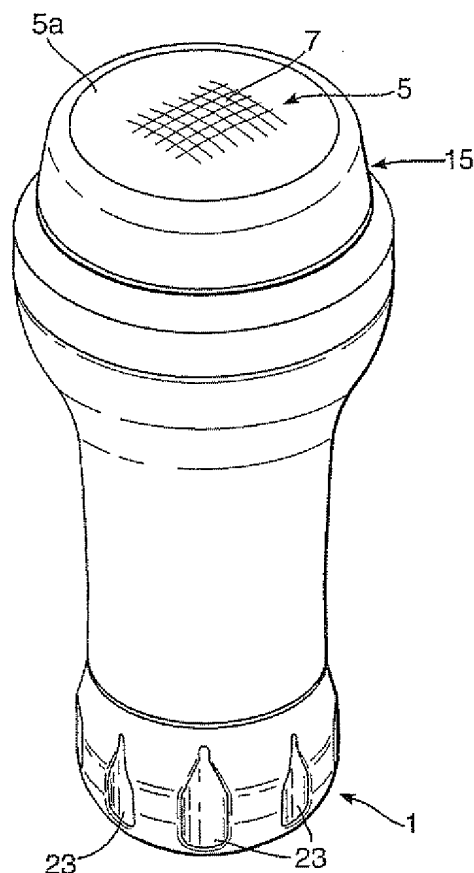
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[Continued on next page]

(54) Title: FABRIC CLEANING DEVICE



(57) Abstract: A device for cleaning a substrate such as a fabric comprises a reservoir (3) for storing a fabric cleaning fluid (9), a scrubbing member (5) for scrubbing the fabric, the scrubbing member (5) in fluid communication with the reservoir (3). The scrubbing member (5) comprises one or more dispensing orifices (7) and a movable platform (11) for forcing said cleaning fluid (9) to exit from the reservoir (3) to the scrubber member (5), where it is exposed on an exterior portion of the scrubber member via said dispensing orifices (7), for cleaning purposes.



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*For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.*

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FABRIC CLEANING DEVICE

The present invention relates general to a fabric cleaning device with a scrubbing member.

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It is an object of the present invention to provide an improved fabric cleaning device.

According to the present invention, there is provided a  
10 dispensing and fabric cleaning device comprising:

- (a) a reservoir for storing a fabric cleaning fluid,
- (b) a scrubbing member for scrubbing the fabric, the scrubbing member in fluid communication with the reservoir,
- 15 (c) the scrubbing member comprising one or more dispensing orifices,
- (d) a movable platform for forcing said cleaning fluid to exit from the reservoir to the scrubber member, where it is exposed on an exterior portion of the scrubber  
20 member via said dispensing orifices, for cleaning purposes.

An advantage of a screw mechanism is that the quantity of fluid delivered is controlled by the screw feed ie. it is  
25 directly proportional to the amount by which the screw is rotated and not dependent on the viscosity of the fluid. This is in contrast with eg. pump dispensing devices. Hence even very high viscosity fluids e.g. pastes can be dispensed accurately using the invention.

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The pitch of the screw is preferably constant so that the platform rises by a constant amount as the screw is turned.

5 With this arrangement an effective washing tool is provided which can be filled/refilled with a cleaning fluids such as a powder and solvent mixture by the user and which can dispense this in an efficient and effective manner whilst also providing for a scrubbing action.

10 The term "fluid" herein is intended to include a liquid, gel, and paste e.g. pastes formed from a solid cleaning product e.g. cleaning/detergent powder, granules, flakes, tablets (which may be crushed), pellets, mixed together with a solvent, e.g. water.

15 The movable platform may comprise a side wall or base wall portion of the reservoir, whereby moving e.g. sliding the platform within the reservoir, progressively decreases reservoir volume which compresses the cleaning composition  
20 which is thereby forced to exit the reservoir and flow to the scrubbing means.

The reservoir is preferably in fluid communication with the scrubbing means by way of an exit orifice or orifices,  
25 through which the composition can pass.

The reservoir is preferably refillable with cleaning fluid or components thereof (e.g. detergent powder and water) by the user. To this end, the reservoir preferably has a  
30 removable (e.g. by a screw fitting or snap-fit arrangement) portion such as an end cap and/or scrubbing member, which

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can be removed to refill the reservoir with cleaning fluid and then secured for repeated re-use. Where the removable portion is upstream of the scrubbing member, the former is preferably provided with one or more exit orifices so that  
5 the fluid can reach the latter.

The scrubbing means and end cap may be formed as a one piece unit and may be formed integrally.

10 The dispensing orifice(s) of the scrubber may be provided by a cover e.g. a material having a mesh structure. The apertures of the mesh may provide multiple dispensing orifices. The mesh may be abrasive to provide a scrubbing surface.

15 Preferably, the external surface of the scrubber member is abrasive. To this end the scrubbing member may comprise a coarse mesh structure. Alternatively or additionally, the scrubbing member may comprise one or projections, such as  
20 finer-like 'villi' or ribs. The scrubbing member may be formed from a rigid material, so that if a mesh or projections are stiff to provide effective scrubbing. However, for delicate fabrics, more flexible scrubbing materials can be used. The scrubbing member may comprise a  
25 plurality of scrubbing surfaces to offer the user a choice. In this way a varied washing load (with both delicate and more harder wearing fabrics) can be treated without the need for multiple tools.

30 The device may comprise an elongate and generally tubular reservoir having a removable end cap with a exit orifice.

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The scrubbing member may be attached to or part of the end cap and may cover the exit orifice, whereby fluid can pass from the reservoir via the exit orifice and then via the dispensing orifices.

5

The platform may be configured for reciprocal axial movement within the reservoir, and may be slidably advanceable toward the end cap by exertion of force by a user, said force compressing the fluid against the end cap to force fluid to exit via the exit orifice to the scrubber member where it is dispensed on the exterior of the scrubbing member via the dispensing orifices for cleaning purposes.

Under release of the force, the platform may be configured to slidably move in a reverse direction to relieve residual stress in the fabric cleaning fluid (for interim storage purposes).

Preferably the platform has a peripheral edge which is configured to slide in a sealing relationship with an inner surface of the reservoir, whereby sliding is guided by said inner surface.

With this arrangement, the device can be used both to store and dispense cleaning fluid with minimal or no leakage via the moving platform.

The user may exert force by means of a feed screw mechanism, so that turning the screw advances the platform a set distance upward. In this way the cleaning composition can be dispensed in a controlled manner. Preferably, the screw

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mechanism does not protrude into the reservoir, for sealing purposes.

The screw mechanism may comprise at least two threaded shafts one fixed to the platform and one fixed to part of the device, the latter being constrained to prevent any movement with the platform. The shafts may engage each other upon rotation to move the platform relative to the reservoir.

The screw mechanism may be telescopic so that an externally threaded shaft engages with an internally threaded shaft.

The device preferably includes an actuator, which allows the user to actuate the screw mechanism and therefore move the platform up and down within the reservoir. The actuator may be attached to one of the threaded shafts, and may form a base portion of the device. The actuator is preferably exposed externally of the device.

The device may be shaped e.g. have one or more recesses or indentations for ergonomic purposes, to ease the handling and gripping of the device during use.

In addition, according to a second aspect of the invention there is provided a method of cleaning a fabric using the device according to the first aspect of the invention, the method comprising the steps of:

- (a) filling the reservoir with cleaning fluid, optionally obtained by mixing a solid cleaning composition e.g.

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powder, granules, and a solvent e.g. water to form a cleaning fluid within the reservoir,

(b) securing a removable portion e.g. end cap and scrubbing member on the device to close the reservoir

5 (c) moving the platform e.g by turning a screw-feed mechanism to force the cleaning fluid from the reservoir to be exposed on the exterior of the scrubbing means;

10 (d) cleaning the fabric by scrubbing with said scrubbing means.

The device of the invention may be supplied as a commercial package including (a) a cleaning fluid and/or

15 (b) a cleaning solid for mixing with a solvent to prepare a cleaning fluid.

(c) instructions to direct the user to use the package according to the method of the second aspect of the invention.

20 Various non-limiting embodiments of the invention will now be more particularly described with reference to the following figures in which:

25 Figure 1 is a perspective view of one embodiment according to one aspect of the invention;

Figure 2 is a side sectional view of the embodiment shown in figure 1, with the platform in a fully lowered position;

Figure 3 is a side sectional view of the embodiment shown in figure 1, with the platform in a fully raised position; and

30 Figure 4 is a enlarged and exploded perspective view of the screw feed mechanism of figure 1.



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Referring to figures 1-3, there is illustrated a fabric cleaning device 1 comprising:

- 5 (a) A generally tubular reservoir 3 for storing the fabric cleaning fluid 9
- (b) a scrubbing member 5 for scrubbing a fabric, the scrubbing member 5 in fluid communication with the reservoir 3 ,
- 10 (c) the scrubbing member 5 comprising one or more dispensing orifices 7 ,
- (d) a movable platform 11 for forcing said cleaning fluid 9 to exit from the reservoir 3 and flow to the scrubber member 5 , where it is exposed on an exterior portion 5a of the scrubber member 5 via said dispensing
- 15 orifices 7, for cleaning purposes.

The term "fluid" herein is intended to include a liquid, gel, and paste e.g. pastes formed from a solid cleaning product e.g. powder or granules and a solvent, e.g. water.

20

The movable platform 11 forms the base portion of the reservoir 3, whereby sliding the platform 11 within the reservoir 3, progressively compresses the cleaning fluid 9 which is thereby forced to exit the reservoir 3 and flow to

25 the scrubbing means 5.

The reservoir 3 is in fluid communication with the scrubbing means 5 by way of a centrally located exit orifice 13.

30 The reservoir 3 is refillable with cleaning fluid 9 or components thereof (e.g. detergent powder and water) by the

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user. To this end, the reservoir has a removable (by a tight, water-tight screw-fitting not shown) end cap 15 which is formed as a single unit with the scrubbing means 5. The scrubbing means is secured to the latter by ultrasonical welding to the end cap 15 which is possible if both are made from compatible material, here HDPE (high density polyethylene). The end cap 15/ scrubbing means 5 can be removed to refill the reservoir with cleaning fluid 3 and then re-secured. As the removable end cap 15 actually forms the roof of the reservoir and is upstream of the scrubbing member 5, the exit orifice 13 from the reservoir is located in the end cap 15.

The scrubber 5 comprises a HDPE (high density polyethylene) material having a coarse, hard mesh structure (such as greenhouse shade cloth fabric). The apertures 7 of the mesh providing multiple dispensing orifices 7. This mesh is sufficiently abrasive to provide a scrubbing surface, however the surface can be altered depending on the material chosen. Eg. a rigid corrugated surface with dispensing apertures could be used.

The platform 11 is configured for reciprocal axial movement within the reservoir 3, being slidably advanced toward the end cap 15 /scrubber 5 by exertion of force by a user, said force compressing the fluid 9 against the end cap 15 to force fluid to exit via the exit orifice 13 to the scrubber member 5 where it is dispensed on the exterior 5a of the scrubbing member 5 via the dispensing orifices 7 for cleaning purposes.

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The user exerts force by means of a telescopic worm drive feed screw mechanism 19 (shown more clearly in figure 4) which is afixed to the underside 11b of the platform 11, and a screw actuator 21 so that turning the screw actuator 21 (which is accessible externally of the device) in one direction advances the platform 11 a set distance upward. In this way the cleaning fluid 9 can be dispensed in a controlled manner. The screw mechanism does not protrude into the reservoir, for sealing purposes.

10

Under release of the force, ie. By unscrewing the mechanism 19 the platform 11 can slidably move in a reverse direction to relieve residual stress in the fabric cleaning fluid 9. The platform has a peripheral edge 11a which is configured to slide in a sealing relationship with the inner surface 17 of the reservoir 3 , whereby sliding is guided by said inner surface 17. With this arrangement, the device can be used both to store and dispense cleaning fluid with minimal or no leakage via the moving platform.

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The device is shaped with an annular band of recesses and protrusions 23 for ergonomic purposes, to ease the handling and gripping of the device during use.

25

In use the reservoir is filled with cleaning fluid, optionally obtained by mixing a solid cleaning composition e.g. powder, granules, and a solvent e.g. water to form a cleaning fluid or paste within the reservoir. The end cap 15 and scrubbing means 5 are then screwed on tightly to the device to close the reservoir. The platform 11 is advanced from a lowered state (fig2) towards a raised state (fig 3) by

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turning a screw-feed mechanism 19 to force the cleaning fluid 9 from the reservoir 3 to be exposed on the exterior 5a of the scrubbing means 5. The user can then cleaning the fabric by scrubbing with said scrubbing means 5. The use of  
5    hardwearing HDPE material reduces tearing of the scrubber 5 during use.

A further embodiment of the device of the invention includes a cleaning fluid and/or a cleaning solid for mixing with a  
10   solvent e.g. water, to prepare a cleaning fluid.  
Instructions to direct the user to use the package according to the method as above, are also included.

It is of course to be understood that the invention is not  
15   intended to be restricted to the details of the above embodiments which are described by way of example only.

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CLAIMS

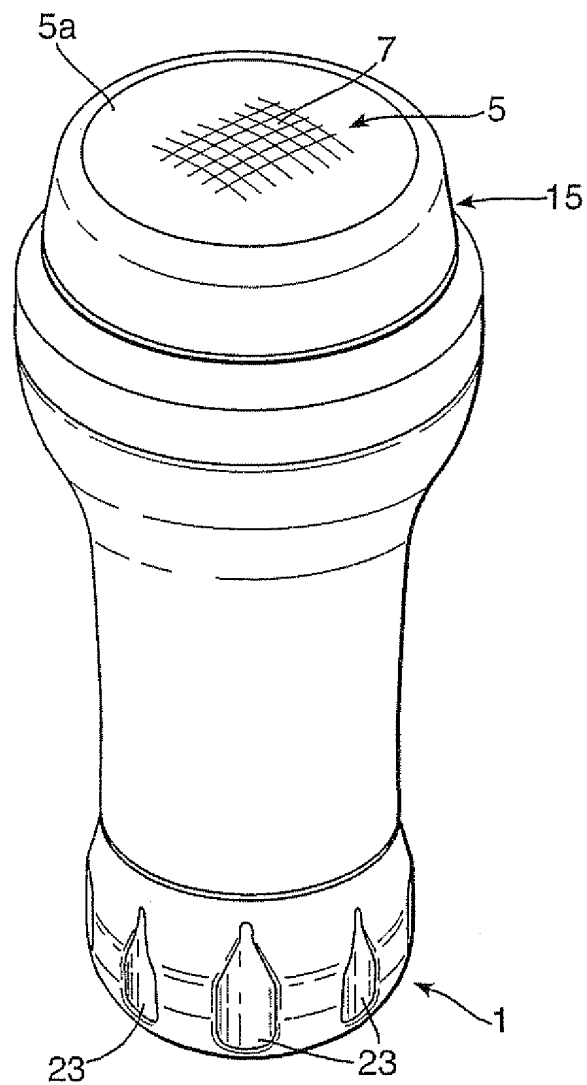
1. A device for cleaning a substrate such as a fabric comprising:
  - 5 (a) A reservoir for storing a fabric cleaning fluid,
  - (b) a scrubbing member for scrubbing the fabric, the scrubbing member in fluid communication with the reservoir,
  - 10 (c) the scrubbing member comprising one or more dispensing orifices,
  - (d) a movable platform for forcing said cleaning fluid to exit from the reservoir to the scrubber member, where it is exposed on an exterior portion of the scrubber member via said dispensing orifices, for cleaning  
15 purposes.
2. A device according to claim 1 wherein the platform comprises a wall or base portion of the reservoir and sliding the platform within the reservoir,  
20 progressively compresses the cleaning composition which is thereby forced to exit the reservoir and flow to the scrubbing means.
3. A device according to any preceding claim in which the reservoir is in fluid communication with the scrubbing  
25 means by way of an exit orifice or orifices.
4. A device according to any preceding claim in which the reservoir is refillable with cleaning fluid or components thereof, by a user.
5. A device according to any preceding claim in which the  
30 reservoir has a removable portion e.g. end cap and optionally scrubbing means for refilling purposes.

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6. A device according to any preceding claim in which the dispensing orifices are provided by a mesh fabric.
7. A device according to any preceding claim in which the platform is configured for reciprocal generally axial movement within a generally tubular reservoir.
8. A device according to any preceding claim in which the platform is movable by means of screw feed mechanism.
9. A device according to any preceding claim in which the platform has a peripheral edge configured to slide in a sealing relationship with an inner surface of the reservoir, whereby sliding is guided by said inner surface.
10. A method of cleaning a fabric using the device according to any preceding claim, the method comprising the steps of:
  - (a) filling the reservoir with a cleaning fluid, optionally obtained by mixing a solid cleaning composition e.g. powder, granules, and a solvent e.g. water to form a cleaning fluid within the reservoir,
  - (b) securing a removable portion e.g. end cap and scrubbing member on the device to close the reservoir,
  - (c) moving the platform e.g. by turning a screw-feed mechanism to force cleaning fluid from the reservoir to be exposed on the exterior of the scrubbing means; and
  - (d) cleaning the fabric by scrubbing with said scrubbing means.

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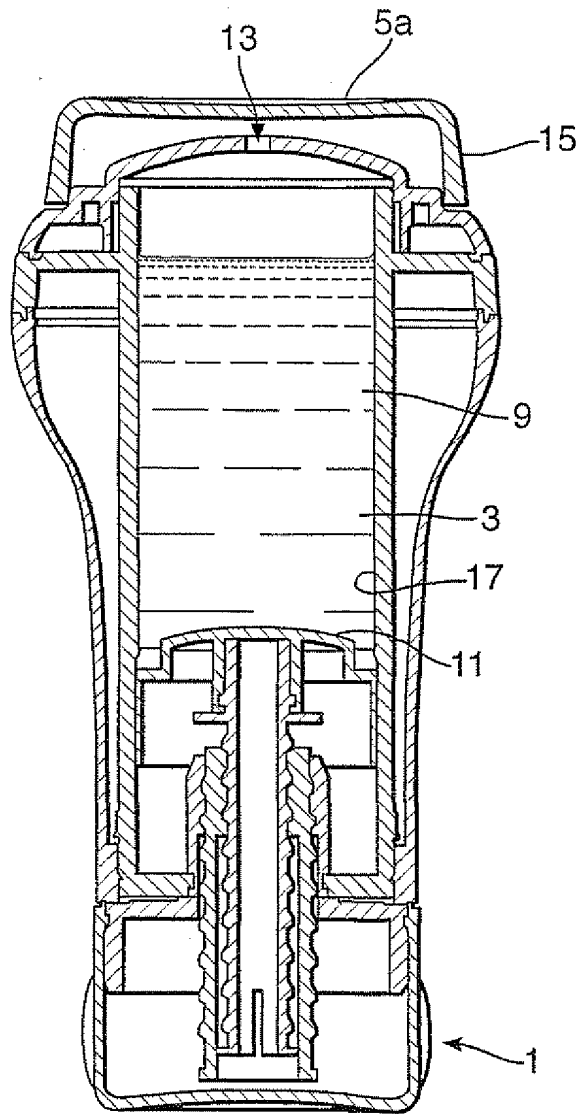
Fig.1.



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Fig.2.

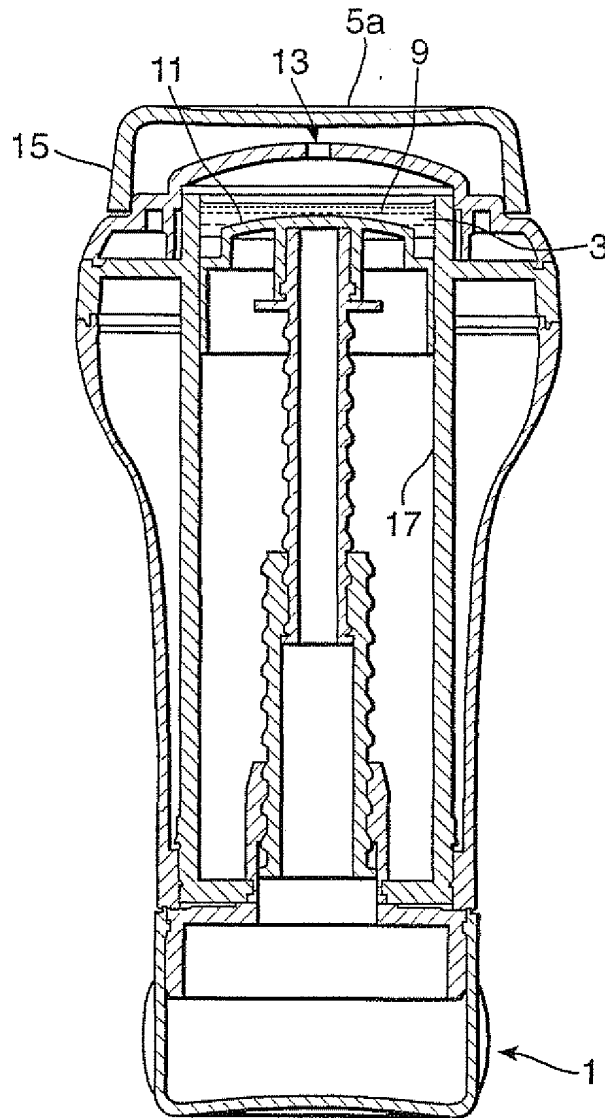


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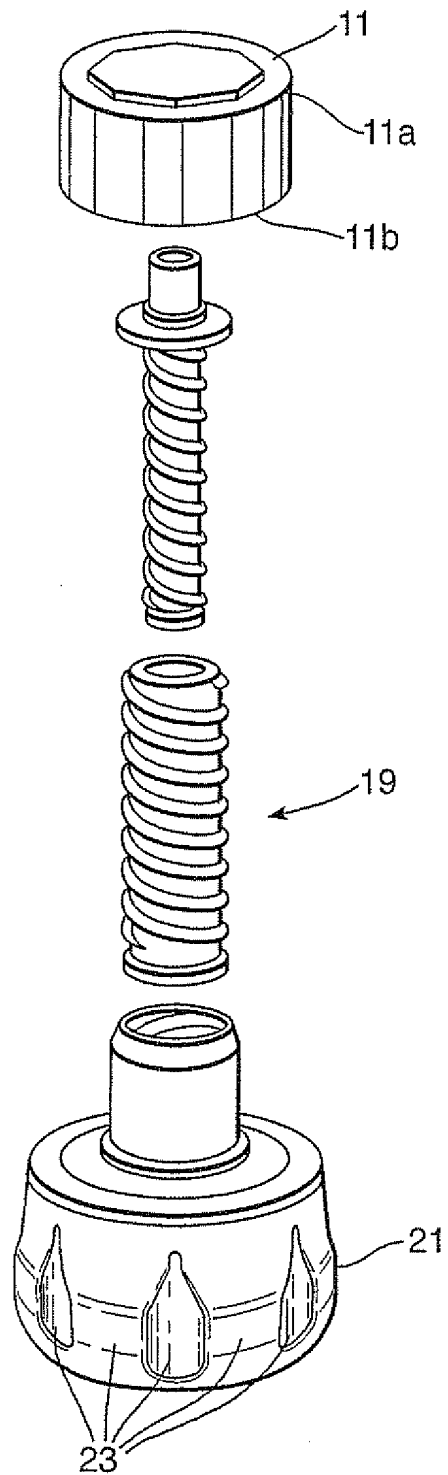
Fig.3.



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Fig.4.



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# INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/012244

**A. CLASSIFICATION OF SUBJECT MATTER**  
IPC 7 A47L25/08

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 A47L A46B B65D A45D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, WPI Data, PAJ

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

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Date of the actual completion of the international search

22 February 2005

Date of mailing of the international search report

04/03/2005

Name and mailing address of the ISA

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## INTERNATIONAL SEARCH REPORT

International Application No  
PCT/EP2004/012244

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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